HOW TO TEACH

Primary Geography.

Hints to Teachers, intended especially for those using
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By ALEX EVERETT FRYE.

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BY

ALEX EVERETT FRYE

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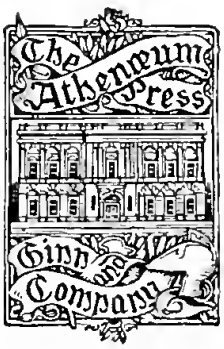


INTRODUCTION.[1]

To Teachers: — Read the Preface to Primary Geography, and then read the rest of the book, in order to get the general plan of the work.

Study each lesson and make it your own. No book of methods can take the place of *live thought.*

Find out what each lesson teaches. Make note of the facts that are to be brought out by the class.

Think how best to throw light on these facts, — whether by pictures, by short stories or by crayon sketches. Above all *know your school district.* Be ever alert to direct pupils to objects that they can see or handle, — to hills, brooks, flowers, animals, people, etc.

Let each lesson grow out of the one preceding it. Forge a chain of thought and each link will help to hold all others in memory.

[1] This little book, *Hints to Teachers*, has been prepared to meet a present demand. A larger *Manual for Teachers* will be issued later.

The work of *making* a definition is of great value to pupils, *when they have ideas to classify.* Such work then tends to vivify and to relate ideas.

Thoughtful teachers no longer treat pupils as if they were parrots to chatter words. The objects themselves are studied, and not their mere word-shells.

Each lesson contains a few words that are new to pupils. Make a list of such words, and be sure that pupils learn the sense in which each word is used, and also how to pronounce it.

Let overworked teachers bear in mind the fact that *each minute spent in preparing a lesson saves ten minutes in teaching it.*

HINTS TO TEACHERS.

1. Geography.

Aim. To interest pupils in the study of geography and to give an inkling of its meaning.

Hints. Lead pupils to talk about parts of the *earth* that they have seen. Webs of spiders, and cocoons of moths, will give an idea of the work of silkworms. See *Arabs* and *camels* on pages 66 and 67.[1] A sandy field will serve to illustrate *desert;* see also pages 49 and 52. Lead pupils to make a collection of spices; see page 80. Talk about the land of the *Eskimo* and *seal;* see pages 63 and 64. Flax, thistle or milkweed will help to teach *cotton.* See *mountains* on page 13.

Do not try to teach all the above in one lesson. Make two or three lessons of it.

[1] All number references are to pages and lessons in the Primary Geography.

For pronunciation of names of places and of other words used in Primary Geography, see page 126. If pupils are to use the *Word List* they should be trained to pronounce the *key words*.

2. Hills and Valleys.

Aim. To lead pupils to look for hills and valleys near home.

Hints. Running water shows which way land slants.

How does a hill differ from a valley? This question does not call for definitions. Pupils can discover that on a hill the sides meet at the top, while in a valley they meet at the bottom; that a hill rises above the land near it, while a valley is lower than the land at its sides; that water runs away from hills, but into valleys, etc.

A few simple questions will help to bring out these and other thoughts. Do not expect too much at first.

Pupils can draw hills and valleys on the blackboards. The *sand tables*, now in use in many schools, will help to illustrate this lesson.

3. Brooks and Rivers.

Aim. To show that the speed of streams depends mainly on the slant (or slope) of the land, and to teach the names *brook* and *river*.

Hints. Look for names in the picture. Rain feeds these brooks. The water flows swiftly in the *rapids*, because the land is steep. Under the bridge the land is nearly level.

The brooks spread over the meadow, because there is a hollow in it. The water fills the hollow and makes a pond.

See pictures of rivers on pages 10, 11, 14, 49. See brooks on pages 5 and 12.

4. Slopes.

Aim. To teach the value of slopes in nature.

Hints. Talk about the slopes near your school, and then find pictures of slopes in this book.

Pupils can discover that the pond in the meadow has already overflowed its banks. The water now runs off as fast as it flows in. In times of heavy rain the water may flow in faster than it can flow

out. Then the pond will spread over more of the meadow.

The text does not state that all ponds and lakes are made by brooks and rivers.

What can pupils find in the picture?

5. Kinds of Soil.

Aim. To lead pupils to observe the kinds of soil in their district.

Hints. If pupils cannot find clay, let it drop from the lesson. Use any kinds of soil. Let the pupils know that the water poured on the soil shows what becomes of rain.

Plants that decay help to form soil. If there is a grove near your school, the pupils may find *leaf mold* in it.

The most important part of this lesson is that of interesting pupils in collecting kinds of soil.

6. Work of Water.

Aim. To show that water washes away soil.

Hints. Try to teach this lesson on a rainy day.

Lead pupils to talk about the picture. Notice the clear sky above the clouds. The rain shows the direction in which the wind is blowing. The sun lights the tops of the clouds.

Have pupils seen washouts? Have they seen roads cut by rain?

Sand is too heavy for slow rills to move. Fine soil is lighter and is more easily carried.

Footnote. — Weather Record.

Aim. To train pupils to observe the weather.

This work lays a basis for the study of climate, and thus saves time in the higher grades. No part of the entire course is more important than the making of these records.

7. Loose Soil.

Aim. To show why soil around plants should be kept loose.

Hints. Let the pupils who try the experiments make a report to the class.

Frost cracks and crumbles soil.

8. Rain in the Soil.

Aim. To teach the work of water in soil.

Hints. Great interest can be aroused by trying some of the following experiments:

Put a few kernels of corn into a bottle of water, and see how soon they will sprout.

Sow a little grass or flax seed in a wet sponge.

Put two or three potatoes in a damp cellar to sprout.

Place a sweet potato in a glass of water and keep it in a warm room. It will make a beautiful vine.

Hollow out a common potato, being careful not to injure the "eyes"; fill it with wet soil, and plant in it an ivy or other vine.

Take good care of the plants and they will tell a wonderful story.

A box of ants will prove very instructive, and pupils will never grow weary of watching these little toilers. The box should have a glass cover. Put in a few crumbs of bread each day.

9. How Soil Settles.

Aim. To show the order in which soil or rocky matter settles in water.

The coarse and heavy matter settles first. The finest soil settles on top.

10. Work of the Brooks.

Aim. To show how brooks carry soil.

Hints. The rapids, of course, roll the pebbles. They wash down the sand, also. If there were no pond, the brook would carry the mud away and deposit it somewhere in still water.

11. Mud Banks or Deltas.

Aim. To show how deltas are made.

Hints. The Greeks gave the name *delta* to the alluvial land at the mouth of the Nile, because this low land was shaped like the Greek letter (Δ) *delta*. The word *channel* is here used in the sense of a trough or cut in which water flows.

See maps of the Orinoco, Ganges and Nile deltas, on pages 32, 42 and 50.

It may be a good plan to turn to the maps on page 29, and show pupils the land and sea. No names for the parts of the sea are now needed.

On page 44 there is a picture of a village built in the delta of the Ganges.

12. Water and Heat.

Aim. To show the origin of clouds.

Hints. The word *vapor* is often loosely used in the sense of cloud, fog or smoke. In this book the word is used in its true scientific meaning. *Water vapor* is water in its gaseous state and, as such, is invisible.

As the water in the bottle is heated, observe the bubbling or boiling. A tiny cloud can be seen coming from the bottle. The deposit of moisture on the cold glass will prove that the cloud contains water.

The cold window will show that the breath contains vapor of water. The water in the tin cup goes away as vapor in the air.

Pupils will readily answer that the cloud from the kettle is made by heating water. They may discover that the hot water changes into vapor, and that the vapor changes into this cloud.

Do not expect too much from pupils in this lesson. Let them see the experiments and tell what they see.

13. Forms of Water.

Aim. To lead pupils to observe forms of water.

Hints. This lesson should be made very simple. The question of dew-point, or of saturation, need not arise.

Tyndall uses the name *water-dust* for *cloud.*

Snow is now thought to be frozen vapor. When *vapor* freezes upon grass, stones, etc., it forms frost. True frost is not frozen dew.

Just before water freezes, it expands. Water at the freezing point is, therefore, lighter than that which is slightly warmer. The colder water rises and freezes over the warmer.

The meaning of the picture is plain. Just as the water in the kettle is changed by heat into vapor that forms a cloud, so the surface of the sea or of the lake is changed into vapor that, in turn, forms clouds. In all these cases, the vapor is in the clear space between the water and the cloud.

14. Springs.

Aim. To direct the thought to water coming out of the ground.

Hints. In some places, as in swamps, the soil is filled with water; but in many places the water finds its way to springs, and thus flows out of the ground.

Many brooks flow in dry seasons, because they are fed by springs. Raindrops may travel for months in soil before reaching a spring.

Note that a spring is not the "place where a stream starts"; it is the flowing water itself. The *issue of water* from the ground, and not the hole in the ground, is the spring.

15. Sources of Streams.

Aim. To show the various ways in which streams form.

Hints. It does not seem best to discuss fully at this time the sources of streams shown in the pictures. Brief mention of each kind will suffice. The larger book of the series gives more details.

One picture on page 7 shows the melting end of a glacier. See, also, the pictures on page 72.

Pupils may need assistance in understanding the picture of the glacier. The entire white mass, looking like a distant mountain chain, is the end of a

great glacier. See the wide cave in the end of this glacier. A huge block of ice has recently fallen.

Page 53 shows other hot springs.

What can pupils discover in the pictures on page 7?

16. Where Brooks Flow.

Aim. To teach that brooks follow slopes.

Hints. Brooks cannot flow uphill, and so they wind around the high places in their paths.

Every stream must flow downhill.

The speed of a stream depends largely on the slope of the land over which it flows, as well as on the volume of water.

Brooks spread out in low and level places.

17. Systems and Basins.

Aim. To prepare for the study of the basins and systems of the grand divisions.

Hints. The lower picture on page 8 shows two brook basins, with their systems.

Show pupils the Mississippi basin on pages 36 and 105.

A basin is land; a system is water. A basin is made of slopes, while a system is made of streams. A system drains a basin.

Point out the great systems and basins on the map, page 32.

18. The Top of a Ridge.

Aim. To prepare for the study of *divides* in the grand divisions.

Hints. A sand table would greatly aid in impressing this lesson. If there is a ridge near the school, refer to it for all answers.

When rain falls on the top of the ridge, part of the water doubtless flows into each valley.

Each valley reaches to the top of this ridge.

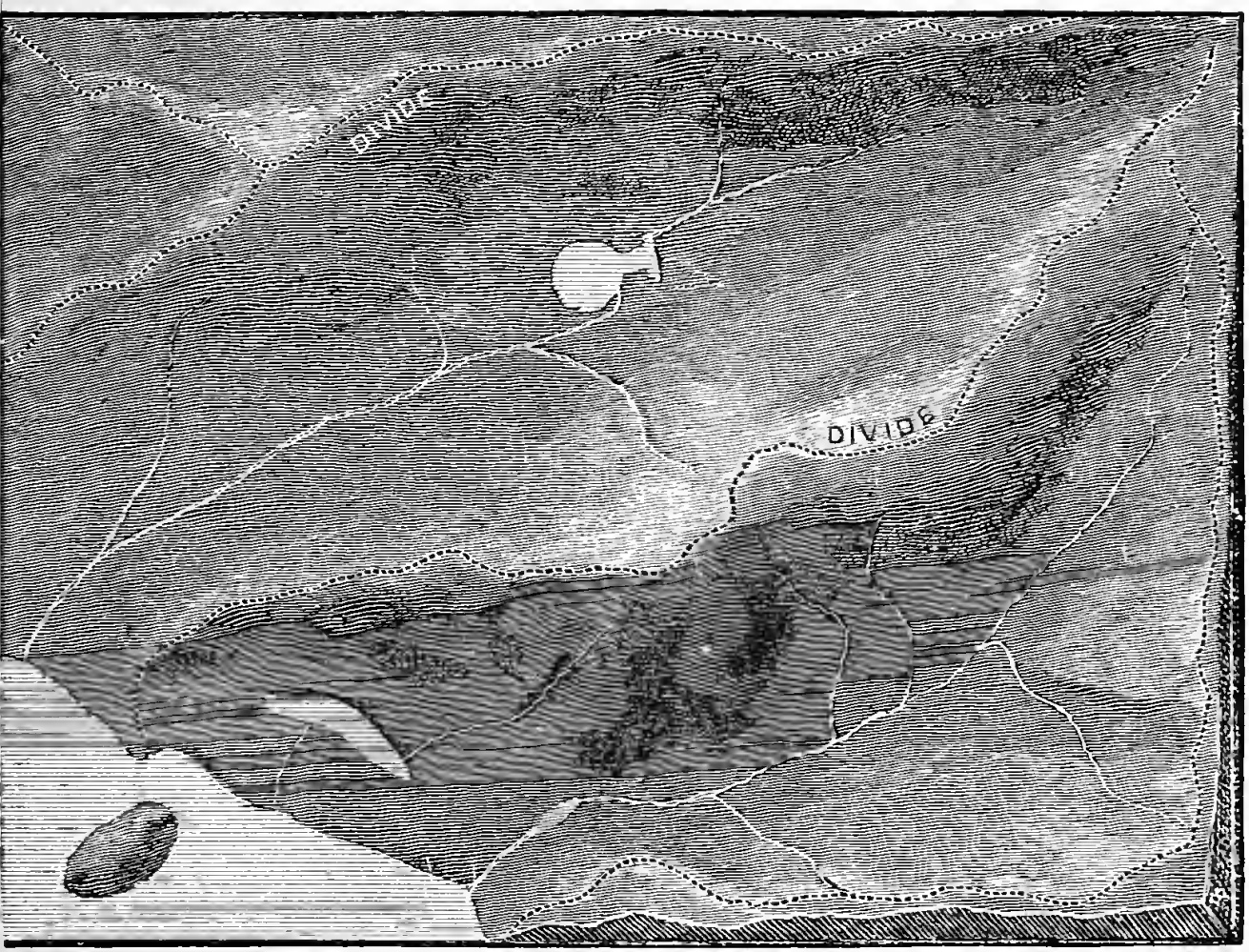
19. Divides.

Aim. Same as in Lesson 18.

Hints. If possible, direct pupils to a divide near the school. One minute with nature is worth a day with a map.

Have you any pictures of divides?

Lead pupils to trace some of the divides on the map, page 32. Make clear the fact that water partings may be on low land as well as on high ranges.



Illustrative Lesson.—It may prove helpful to teachers to study this report of a lesson.

The aim is to teach how rain is gathered into streams. The teacher shows to the class a map like the one on this page, but made in actual relief on a

sand table. This map is made of clay or of putty, and is covered with a thin layer of loam.

Water is *sprinkled* upon the map, and tiny streams form in the low places.

Teacher.—"In what direction does every brook flow?"

Pupils.—"It flows downhill."

"It follows the valley."

"It flows from the high places to the low ones."

"It runs down the steepest slopes."

Teacher.—"In what part of a valley should you look for a brook?"

Pupils.—"We should look in the lowest part."

"A brook is just between the slopes."

"It is where the slopes from both sides meet."

Teacher.—"How much land does a brook drain?"

Pupils.—"It drains a valley."

"It drains all the land that slopes toward it."

"Water flows from the sides of the hills into the brook."

Teacher.—(Sprinkling water upon the middle ridge) "Into which valley does this water flow?"

Pupils.—"It flows into both."
"Part flows into each."

Teacher.—"Why does not all the water flow into one valley?"
Pupils.—"Because it can't flow up hill."
"It must flow down the slope."
"The land is too high between the valleys."

The teacher now points to many parts of the map, and asks to which valley each part belongs. The pupils answer readily until the finger rests upon the *divide*, and the class is in doubt.

Teacher.—"Can you find other places like this?"
Eager fingers then trace the divide between the valleys.

Teacher.—"To which valley does this line belong?"
Pupils.—"It doesn't belong to either."
"It belongs to both."
"It is just between the valleys."
"Both valleys begin at this line."

Teacher.—"On which slope is this line?"
Pupils.—"It comes between the slopes."

"It is on both slopes."

"The slopes meet at this line."

Teacher.—"We will call this line a *divide.* Can you tell why?"

Pupils.—"Because it divides the land into two valleys."

"Because it divides the slopes."

"It turns the rain in two directions."

Teacher.—"Open your geographies at page 9. Point to a high divide that has snow upon it. Point to one on low hills. Can you find one on land that is nearly level?"

Notes on the Lesson.—It had been carefully prepared. The teacher had a definite aim. The questions were direct and simple. The thinking was done by the pupils. Each question was answered in several ways, showing that pupils were allowed time for thought.

20. How Slopes Are Worn.

Aim. To lead pupils to think of the wasting away of land masses.

Hints. Use any piece of wood that has begun to decay.

Nearly every pebble taken out of the soil shows decay. A shell of soft stone surrounds the hard nucleus. The outer part has begun to decay.

Pupils can find many pieces of rock in all stages of decay.

Look at the ground under the eaves of buildings, and see how the rain has worked.

The "rocky cliff" on page 17 has been cracked and crumbled by frost.

The cañon of the Colorado, page 38, and the gorge of Niagara, page 39, were made by running water.

21. Beds of Streams.

Aim. To show how streams wear their beds.

Hints. The Shoshone river has cut this bed in layers of lava. The cliff beyond the falls is made of lava and ashes.

This ice jam is in the Mississippi. The mud, sand and stones held by ice are left in the places where the ice melts.

The portion of Niagara river that is above the falls flows on hard limestone. Under this, there is a

thick bed of soft stone (shale). The falling water easily wears out this shale, leaving the limestone overhanging the gorge. From time to time the limestone breaks off and falls into the gorge. The picture on page 39 shows pieces of fallen rock.

In the little cut of Minnehaha, pupils can see layers of rock back of the falls.

Stones in a river bed are rounded by being rubbed together. After a long time these stones will be ground to sand and mud. The rivers carry part of this rocky matter wherever they flow.

22. Valleys.

Aim. To show types of valley forms.

Hints. Do not forget that the district should be studied.

See pictures of valleys on pages 45 and 49. That on page 49 is a fine example of a transverse valley. It crosses a range.

One of the pictures on page 11 shows the Hayden valley, in Yellowstone Park. This will serve to illustrate a wide valley.

The cañon of the Colorado shows the cutting of a river in a dry region. The banks are steep, because

there was not enough rain to wear them very far back while the river gouged its bed.

In the primary course it does not seem best to enter very far into the causes of shapes, but merely to show a variety.

Pupils can bring to school many pictures of valleys.

Rain, streams and moist air cause the sides of valleys to waste away. The glacier melts as it reaches lower levels. See glaciers on pages 7 and 72.

The sand table will aid greatly in the study of valleys. Give several lessons on valleys.

23. Mountains.

Aim. To teach types of mountains.

Hints. The Cascade peak is made of tilted and folded rocks. Page 14 shows the Rhine valley, "long and deep," in a plateau. The Temples of the Virgin are merely fragments of a plateau. The sharp points standing near the "mesa" were once a part of the mesa or plateau.

Pico volcano shows clearly the cooled lava. The word from which crater is derived means a "dish for

mixing"—a very apt name. It would interest pupils to tell them a story about Vulcan, the god of fire. See any good book of myths. The eruption of Vesuvius, burying Pompeii, forms a basis for a good story.

Pupils should see types of the low, rounded ranges, such as the Jura and Alleghany, as well as types of rocky ranges. Mt. Mitchell is a typical dome, and the range pictured above it may be taken as a type of low, rounded mountains. The flowers that show in the picture of Mt. Mitchell are the *royal rhododendron*—the glory of the southern mountains. In places these flowers cover hundreds of acres.

See crests on pages 32, 35 and 45.

The soil on steep slopes is generally poor, because the finest part of it is washed away by rain.

Study the pictures on page 13. Give several lessons on mountains.

24. Plains.

Aim. To show some of the ways in which plains are formed.

Hints. This Dakota grainfield is part of a vast plain that was at one time the bed of a lake. It is

thought that on the north this lake was shut in by a mass of ice, near the close of the ice age.

In the state of Idaho alone there are about 12,000 square miles of lava plain, like that in the picture. The Shoshone falls, page 10, are in this lava region. The flow of lava must have come through long fissures or cracks.

The Rhine flood plain is made of soil brought down by the river. There are thousands of square miles of flood plain along the Mississippi and its branches.

See plains on pages 39, 82 and 92. The Colorado river, page 38, flows through a plateau.

Show pupils how low plains and plateaus are pictured on maps, pages 32 and 42.

Give several lessons on plains.

25. Shore Forms.

Aim. To compare the outlines of shore forms.

Hints. Collect many pictures of shore forms. These should show islands, capes, bays, etc., of many shapes and sizes. Have pupils draw some of these shapes.

As each form is taught, show one or more like it on the map, page viii, opposite page 1.

Make one entire lesson on islands, another on peninsulas, etc.

It would be mere waste of time to search for differences between bays and gulfs or seas. Glance at the map, page 24, showing the bay of Bengal, the gulf of Guinea and the Arabian sea. Why should one be called a gulf and another a bay or a sea?

Pupils can doubtless bring many excellent pictures.

26. Work of Water on Shores.

Aim. To show how coastlines are shaped by water.

Hints. Gravel consists of small pebbles, and is often mixed with sand.

The stones on the shore near the clay cliff came from the cliff. Water washes the clay from under the stones and they fall.

The loose earth at the foot of the rocky cliff will in time be swept away by waves and tides.

The caves in the middle cliff were made by waves. Seaweed protects shores from the action of waves and rolling stones. A coat of seaweed helps to prevent frost from cracking the rocks.

The picture marked "Dunes" shows how sand has been drifted by winds.

The Stones of Stennis are ruins of an old Druid temple in Scotland. The shore around these stones is low and grassy. Grass prevents sand from drifting.

Deep water is needed in harbors, in order to float large ships. High shores help to shut out strong winds.

As a rule the best harbors are on rocky coasts. Harbors on sandy coasts are apt to be shallow and easily swept by gales.

Spend three or four days on this lesson.

27. Points of the Compass.

Aim. To teach directions.

Hints. Pupils can readily be led to discover that the sun does not always rise in the same place, but that it rises in or near the east. The sun is in the south at midday, and at that time casts the shortest shadows. Make the definite midday shadow the starting point for teaching directions.

Can pupils *discover* the difference in time between true *midday* and the noon of railroad time ?

Pupils should become familiar with the directions indicated by letters around the compass on page 18.

28. How Maps Are Made.

Aim. To show pupils how to draw to a scale.

Hints. No teacher will make the mistake of having pupils copy the plans shown in this lesson. These plans are intended to show pupils what parts of their own schoolroom, house, yard and district they should draw.

29. Reading Maps.

Aim. To show pupils how to read the outline maps in their geographies.

Hints. A series of maps leading out from the pupils' own school district would prove more helpful than this series.

The class can make original maps of the parts of the district with which they are familiar.

Be sure that the pupils know what the lines on the maps represent. Each sign on a map is like a word in a sentence. There must be ideas behind the signs or there can be no thought. Map signs, like words, are of no use unless they help to relate ideas.

On page 101 there is a picture of a New York water front.

30. Form and Size of the Earth.

Aim. To give some idea of the form and great size of the earth.

Hints. "If an ant were placed on a large balloon, do you think that to the tiny creature the balloon would look round?" This question may awaken thought on the part of pupils.

Cut a very small round hole in a piece of cardboard and place it against a globe so that a small part of the surface of the globe will appear in the hole. This part will look level.

A common illustration is that of a train going 25,000 miles. Such a trip would take more than a month.

The rings on the moon are thought to be craters.

31. What a Hill is Made of.

Aim. To direct the thought to what is beneath the surface of the earth.

Hints. Tell pupils that rocks are sometimes covered with clay, sand or water, as well as with gravel.

The water in the picture flows upon rock. Streams flow also, of course, upon clay, gravel or fine soil.

By shaking pieces of sharp rock in a bottle, pupils have found that sand consists of little grains of rock.

If there is no clay in the school district, omit the question, "What is clay?" Pupils are not expected to tell the composition of clay, but merely to tell some of its properties: when wet, it is sticky; when molded or pressed, it readily retains its shape; when baked, it becomes very hard.

The answers of pupils to the questions will be very simple.

32. What the Earth is Made of.

Aim. To teach what the earth is made of.

Hints. On page 29 there are four maps of the earth. On these globes the mountains are greatly exaggerated, in order that the slopes from them may be plainly seen.

It is not known whether the interior of the earth is in a liquid or in a solid state. The ball of rock may be solid to the center.

33. The Air.

Aim. To make pupils conscious of the presence of air all about them.

Hints. It is the air, of course, that offers resistance to the falling paper.

Pure air cannot be seen, at least in small quantities. The blue color of a clear sky is largely due to the presence of dust motes.

We can feel air when in motion.

34. The Shell of Air.

Aim. To direct the thought to the earth in its shell of air.

Hints. In how many ways can pupils prove that there is air about them? Let pupils discuss these questions: "Is the air of greater use when calm or when in motion?" "When warm or when cold?"

35. The Poles.

Aim. To teach directions on the globe.

Hints. Guard against the thought that there is a line drawn through the earth or that there are pegs at the poles.

Try tossing a ball into the air and discovering the direction in which its axis points.

Pupils will be greatly interested in meeting the teacher some evening to look for the pointers and the north star.

It does not seem necessary to direct the attention of pupils to the fact that the north star is not exactly in line with the earth's axis.

Impress upon pupils that north is toward the north pole. When they can tell the directions in which all the arrows on page 23 are flying, there will be no difficulty in reading directions on all the maps in the geography.

36. The Equator.

Aim. Same as in Lesson 35.

Hints. Find the equator on each of the maps on page 23. Give thorough drill in reading the directions in which the arrows on the maps fly.

Hold a ball in the sun, and see what part is lighted by the direct rays.

At the close of this lesson turn to the colored maps on pages 105 to 115, and find on them north, south, east and west.

Review often the work outlined on page 23.

37. The World Ridge.

Aim. To teach the simple unity in the world's great highlands.

Hints. A small globe in the hands of each pupil would prove of great value. There should be at least one globe in the schoolroom.

Opposite each large relief map there is a small *key map*, giving names that occur in the text. Other names can be found on the colored maps, pages 105 to 115. Show the pupils how to use the key maps.

Train pupils to read maps. What can they read from the map on page 24? They can find the north pole and the equator (see page 23); they can tell which lines run north, south, east or west; they can point to the land and to the sea; they can find the great plains and the plateaus; they can show where the highest divides run, and where the great streams flow. Give the pupils a chance, and they may surprise the teacher with their skill in reading maps.

For explanation of the parts of this map that project beyond the circle, see note on page viii.

By turning the book to right and left, it will be seen that each grand division is but slightly dis-

torted. This is, doubtless, the most accurate projection for making a map of the land areas.

We may speak of the north pole as being not far from the middle of the world ridge.

38. Andes Highland.

From this time on do not let the pupils lose sight of the unity of the globe relief. As each new form is studied, show its place on the map on page 24, or on page viii.

On page 31 there is a picture of a condor in the Andes. See map on page 32, also.

This lesson brings us to the first of a series of short stories. These are to help fix in mind the leading facts of the lessons. The stories are to be read, but need not be closely studied.

39. Rocky Mountain Highland.

Look for this highland on the relief map of the globe, page 24.

Pupils can easily see that the Andes highland is higher but narrower than the Rocky Mountain highland.

There are pictures of parts of the Rocky mountains on pages 12 and 35. See map on page 36.

40. Highland of Tibet.

See picture on page 41, and map on page 42.

The longest plains of Asia are north of Tibet.

41. Highland of Abyssinia.

From Asia the world range extends into Africa. A spur from this great ridge enters Europe, but no part of the divide between the great ocean basins enters that grand division.

The two ends of the world ridge are at Cape Horn and Good Hope.

See map on page 50.

42. Slopes from the World Ridge.

The Atlantic slopes are on the inner side of the world ridge. The Pacific slopes are on the outer side.

Have pupils show on the map, page 24, the long and short slopes from each of the four great highlands in the world ridge.

43. Selvas.

On page 33 there is a scene in the selvas.

The picture on page 27 shows natives without clothing. From this picture pupils can readily judge that the air of the selvas is warm.

Skill in reading pictures is of far greater value than mere memory of the text.

44. Western Plains.

There is a picture of a grainfield on page 82, and of a cotton field on page 92.

The prairies are plains, but they do not form part of the Western plains.

See map on page 36.

45. Tundras.

On page 41 there is a scene on the tundras.

The animals on page 43 live in great forests that grow on the plains north of Tibet.

The word *tundras* appears on the key map, page 25, and also on page 43.

46. Desert of Sahara.

On pages 49, 52 and 112 there are pictures of parts of the Sahara.

Some parts of this desert are covered with rocks, and other parts with parched soil.

See map on page 50.

47. The Grand Divisions.

The names used in this lesson appear on the maps of the hemispheres, page 28. Have pupils show the grand divisions on the little globes pictured on pages 28 and 29.

See, also, map on page 24.

48. The Oceans.

Follow the suggestions given under Lesson 47.

Page 78 shows a junk on the Pacific. On page 64 there is an Arctic scene. There is an Atlantic steamship on page 100.

The Pacific is the largest ocean. The Atlantic is next in size.

49. The Bottom of the Sea.

Lead pupils to think of a coastline as the line where the land slopes under the sea. This line shows how far water rises on the slopes of the grand divisions.

The land is being constantly worn by streams and waves, while the sea is ever spreading material evenly over its bottom. The work on the land consists largely of tearing down. The work in the deep sea is that of building. Thus we see why the bottom of the sea is not cut and gullied like the surface of the land.

Bring out the thought that the characteristic appearance of the sea bottom is that of a vast smooth plain. There are broad plateaus under the sea, but they have not the appearance of land plateaus that have been worn by rain.

Dwell upon the darkness of the deep sea and its coldness. Look for pictures of fish peculiar to deep sea.

The shores of the grand divisions are the feeding grounds of many of the best food fishes. Waves churn and help to grind sea plants, and thus prepare food for fish.

50. Coral Islands.

Encourage pupils to collect specimens of coral. Look for pictures of other coral islands.

On pages 80 and 81 there are pictures and descriptions of breadfruit, cocoanut and banana. These are the chief food plants on many coral islands.

This lesson illustrates the grinding power of waves. It also shows what becomes of part of the land waste.

51. Surface of South America.

Many teachers may prefer to place lesson 52 before 51.

Refer constantly to the map on page 24.

Lesson 38 states that the Andes highland reaches one fifth of the distance round the earth.

The lofty plateau near the bend in the Pacific coast is that of Bolivia. Notice that the *lake* is two miles and a half above sea level. The border ranges rise much higher.

Study the picture above this lesson.

On page 120 there is a map that will serve as a guide for modeling and drawing. Many teachers prefer not to have pupils model the grand divisions

in the primary course. Pupils can readily learn to sketch these maps. Large maps modeled in sand by teachers are of great assistance.

52. Map Studies.

This lesson is one of a series of map studies. See also lessons 58, 68, 74, 80 and 85. These questions are so graded that when pupils reach lesson 85 they should know how to read a map without assistance.

Teachers should not lose sight of this *growing power to read maps*, for it is worth much to pupils. It is earnestly hoped that teachers will study the *grading* of map questions in the lessons cited above.

Pupils will readily answer that the middle part of the Andes highland looks widest and highest.

On the west slope of the Andes there are no long rivers because the slope is steep and short.

Train pupils to use the key maps.

The picture of the globe on page 33 is one of a series intended to keep *comparative sizes* and *relative positions* before the eyes of the pupils. These globes show the relative positions of both land and water areas. Ask questions leading pupils to study the globes. In addition to South America the globe on

page 33 shows parts of three other grand divisions and of four oceans. These furnish a "setting" for South America.

53. Amazon River.

The pictures on page 84 show some of the animals of the Amazon valley.

The lily in the picture on page 33 is the *Victoria regia.* The stork is standing on a lily leaf. Note how the edges of the leaf are turned up.

What can pupils find in this picture ?

It is said that the word Amazon comes from a native word, meaning *boat destroyer*, and refers to the great wave or *bore* that sometimes rushes up the river from the sea.

54. Highland of Brazil.

Use the maps on pages 24 and 32.

A great deal of Brazilian coffee goes under other foreign names. More than three fourths of the coffee used in this country is raised in Brazil. Comparatively little comes to the United States from Java.

This story teaches that the climate of Brazil is warm and moist.

Notice the blossoms and berries together on a sprig of coffee. This growth is characteristic of the coffee tree.

55. Pampas.

The general slope of the La Plata basin is towards the south.

Custom sanctions the expression, "the La Plata," although *la* means *the*. Rio de la Plata means *river of silver*.

The basin of the Amazon is about twice as large as that of the La Plata. See tables of statistics, page 119. A part of the highland of Brazil divides these basins.

56. Isthmus of Panama.

The straw huts in the picture belong to the poorer class of people. These people dress mainly in cotton cloth.

Many donkeys or *burros* are used on the Isthmus. On page 37 there is a picture of one of these small animals.

57. Surface of North America.

Use the maps on pages 24 and 36.

The *ranges* rise much more than a mile and a half above sea level.

Help the pupils locate the pictures of this group.

Nantasket is near Boston; Ottertail range is part of the Rocky mountains in Canada, not far from the United States border.

These bison are a remnant of the vast herds that once roamed over the Western plains. The picture shows a small herd now kept in a park in Manitoba, Canada.

58. Map Studies.

Notice that these map questions do not help pupils so much as those under South America.

Pupils can show on the map, page 24, what part of the world ridge is in North America.

It will be interesting to note what the relief map tells your pupils. Will they see that the great highland is on the west side; that there is a small highland along the Atlantic coast; that between these highlands stretches a vast plain; that the

coastline is more broken on the north and east than on the west; that the longest rivers are east of the great highland? Teachers may need to ask a few guiding questions, but let pupils do all they can without such help.

The little globe on page 37 shows the position of North America relative to four other grand divisions and three oceans. Lead pupils to see these relations.

Compare the two globes on pages 33 and 37, and tell which is the larger, South America or North America. See tables of statistics on page 118.

These Mexican children live in straw huts, and dress in cotton cloth. Their dress shows that the air is warm.

See model map on page 121.

59. The Rocky Mountains.

The aim of this story is to lead pupils to think of steep and rugged slopes among the Rocky mountains, and of the difficulties of travel in this region.

The donkey, with his load, will form a good subject for a language lesson.

Pikes Peak is not far from the city of Denver. See map, page 105.

60. Colcrado Cañon.

The answers to the questions can be found on the key map, page 37.

The "Cañon in Arizona" is a characteristic picture of the region south of the Colorado river.

61. The Height of Land.

The word *Height* may convey a wrong impression to pupils. The grainfield on page 14 is near this Height, and many fields like this are on the Height of Land.

The Welland canal joins Lake Erie with Lake Ontario. The change in level between these lakes is about 300 feet.

62. The Mississippi Basin.

The Mississippi basin is roughly bounded as follows: On the west by the Rocky mountains, on the north by the Height of Land and a low swell that runs south of the Great Lakes, and on the east by the Appalachian highland.

63. North of the Height of Land.

In this primary course it does not seem desirable to spend much time studying the region north of the Height of Land.

In lessons 64, 65 and 66, refer to the relief map on page 36.

67. Surface of Asia.

See tables of statistics on page 118.

Refer to the map on pages 24 and 42.

Study the picture on page 41. Mt. Dunkia is in the Himalayas north of Calcutta. This peak is about four miles and a half in height.

The natives in the picture of the tundras are Samoyedes. They belong to the yellow race.

68. Map Studies.

Study the maps on pages 24 and 43.

The longest slope is north of Tibet.

For *directions*, refer to maps on page 23.

What grand divisions appear on the little globe on page 43?

The model map of Asia is on page 122.

In lessons 69, 70, 71 and 72 refer often to the relief map.

73. Surface of Europe.

Use the map on page 24.

On page 13 there are two views of the Alps—Mt. Blanc and the peaks near Les Près, France. Mt. Blanc is in France.

The highest peak in Europe is Elbruz, in the Caucasus range.

Study the pictures on page 45. The Rhine view shows the famous vineyards opposite Bingen. At the top of the bluff, or palisade, may be seen the great Germania monument.

This is the Viesch glacier. The medial moraine is very clearly shown.

74. Map Studies.

Are pupils learning to *read maps?* Ask guiding questions, if necessary.

Europe is on the inner side of the world ridge.

What grand divisions and oceans are shown on the globe, page 47? Compare the area of Europe with that of each of the other grand divisions studied. See little globes.

The model map of Europe is on page 123.

Do not forget to refer to maps in lessons 75, 76, 77 and 78.

79. Surface of Africa.

Study the pictures.

The Nile view shows the landing place at Assouan; see map, page 113. Several caravan routes lead to this place, because there are no cataracts in the river below.

The scene in the Atlas mountains shows a Moorish town, and a fine example of transverse valley.

80. Map Studies.

Do not neglect the world ridge map, page 24.

Can pupils read the relief map of Africa without assistance?

Have pupils learned how to read the little globes? What can they read on the globe, page 51?

The Suez canal has no locks. This great ditch is about one hundred miles in length.

The model map of Africa is on page 124.

Study the pictures in lessons 81, 82 and 83.

84. Surface of Australia.

The position of Australia, relative to the world ridge, is shown on the key map, page 25. See also map on page 73. This grand division is on the outer side of the great ridge.

New Zealand is shown on the map, page 115. Find the Blue mountains, also, on this map.

The tree ferns in the picture give a hint of the great ferns of the coal period.

These hot springs of New Zealand are known as the "white terraces."

85. Map Studies.

Read the relief map of Australia, and then read the little globe on page 54.

The model map of Australia is on page 125.

Lessons 86 to 94.

The aim of these lessons is to interest pupils in the study of the races, and to give some knowledge of the home life of people in other lands.

The stories deal with race characteristics. Incidentally, they introduce facts concerning the climate, plants and animals of these lands.

The pictures should be studied very carefully. At the end of each lesson a few questions are asked. They are answered in the text or in the pictures.

The last question under lesson 90 aims to bring out the thought that the clothing of each race is best suited to the climate and habits of that particular race.

Locate on the map, page 73, the scene of each lesson.

95. Homes of the Races.

Study the natural boundaries of races in the Old World. Note that high chains of mountains separate the yellow and white races in Asia. Nearly all Europe belongs to the white race. Roughly speaking, the desert of Sahara divides the lands of the white and the black races in Africa.

The Malays are chiefly an island people.

The Eskimos are classed with the yellow race. People of the black race are scattered along the warm coasts of America. About one tenth of the people in the United States are Negroes.

There are only about 250,000 Indians in the United States, but the number of people of this race in Mexico, Central America and South America runs far into millions.

96. Homes of the Nations.

A nation is a large family.

Try to name a country that is not wholly or in part bounded by natural features.

With slight changes the story in this lesson would apply equally well to the Indians of America, to the Negroes in Africa, or to any other race

97. Map Studies.

These map studies are placed here for the convenience of teachers that wish to include in this part of the course the study of location of countries.

Some teachers will select from the questions those that call for the location of leading countries only. Such a list would, doubtless, include those named on page vii of the Table of Contents.

Many teachers will doubtless omit this entire lesson.

98. Home Lesson for a Hot Day.

In some places teachers can take their pupils out into the fields to study this lesson.

Encourage as many as possible to try the experiments.

99. How the Air is Heated.

Pupils that try the experiments named in lesson 98 will learn most from lesson 99.

It is thought that the sun's rays pass through pure air without heating it.

The leading thought of this lesson is this: The sun's rays do not heat the air directly, but the surface of the earth changes sun's rays to heat, and gives the heat to the air. Clouds and dust help to perform the same work.

NOTE.—Scientists are at present inclined to believe that the old theories concerning "heat rays" and "light rays" are wrong, and that heat and light depend not on different kinds of rays, but on the nature of the bodies which absorb the rays. Of course, this question will not arise in this lesson.

100. How the Earth is Heated.

Pupils should be led to observe the varying path of the sun. Such work would prove of far greater value to them than would any text that could be written.

Take for a problem the question: *At what time of year does the sun shine the shortest distance into a room at midday?*

If your schoolroom has no south window, try the experiment *regularly* at any hour of the day when the sun enters an east or a west window.

Once a week at the appointed hour mark on the floor the inner edge of the sunlight. This may be done by driving small tacks into the floor.

Suppose that the record is begun in early autumn. Week after week pupils can discover that the sun runs lower and lower, for its light reaches farther

into the room. At length, in the latter part of December, it remains the same for a few days. Then the path of light becomes shorter, and we know that the sun is rising higher and higher in the sky. In June the sunlight reaches the same point for several days, and then the shadows of objects begin to lengthen.

The answer to our question is: *The latter part of June.* This answer is of very little consequence, unless pupils have been led to observe the changes taking place in nature, during the passing seasons. They can discover that the path of the sun determines each season, and this fact is the key to the study of how the earth is heated.

Mark the shadows and study the seasons, and pupils will easily comprehend the lessons on belts of heat.

Lessons 101, 102, 103 and 104 need occupy but little time. Most teachers will doubtless prefer not to try to explain in this primary course the relation of the earth's revolution on a fixed axis to the changes of season. It would seem better to leave that philosophy for the more mature minds to grapple. Keep the work very simple.

105. Belts of Heat.

For the convenience of teachers that wish to include in this course the study of the zones of light, a lesson has been added on page 125.

The map on page 24 shows what river basins are crossed by the equator.

The rivers that flow into the Arctic ocean are those that drain most of the northern parts of Asia, Europe and North America. Pupils do not yet know the names of these rivers.

Pupils need not study the exact bounds of the heat belts. It will be sufficient if they learn which of the large river basins are wholly or in part in the various belts. The questions in the lesson will serve to direct this study.

In the larger book of this series the lines of heat will be studied. The aim of this lesson is to prepare the way for the study of plant belts.

106. The Trade Winds.

Within a few years many of the theories relating to causes of winds have been set aside. Ferrel's work has placed this study on a new footing.

Pupils can easily be led to discover the principle of motion resulting from difference in pressure or "weight," but the application of this principle and of Ferrel's theory of the effect of the earth's rotation seems to be far beyond the grasp of primary pupils. The difficulty will be evident to teachers that are familiar with *Davis' Elementary Meteorology* or with *Ferrel's Popular Treatise on the Winds.*

It may not be amiss to caution teachers not to overlook the fact that the polar regions are areas of *low* pressure, and that the tropics of Cancer and Capricorn are in or near belts of very *high* pressure.

Lesson 106, in Primary Geography, gives a simple outline of the more important winds, and most teachers will doubtless be content not to press the subject farther, in the primary grades.

107. The Gulf Stream.

The causes of ocean currents and their general plan of circulation are clearly not within the scope of this book. It has been thought best, however, to treat of two great currents, because of their influence upon the climate of important countries.

Find on the maps all places mentioned in this lesson. Lesson 72 describes bamboo. Many fishing rods are made of this plant.

108. Where Plants Grow.

The tufts on thistle seeds enable the wind to scatter them about.

Seeds that float may be carried to other places by streams or by the sea.

Teachers will need to modify the questions in this lesson to suit the locality. Ask many questions concerning plants that grow near the schoolhouse.

109. Soil, Water and Heat.

The experiments suggested under lesson 8 will throw light on this lesson. The aim is to direct the thought to the relation of plants to soil, water and heat. This will help pupils to understand the distribution of plants in belts and regions.

110. Plants of the Hot Belt.

Study the pictures under this lesson. See also the *Hot Belt* on page 81, and the pictures on pages 23, 33 and 34.

How many kinds of spice can the pupils bring for a school cabinet ?

111. Plants of the Warm Belts.

See the pictures on pages 40, 44 and 92.

Interesting language lessons may be given on the products of these belts.

Refer often to map on page 77.

112. Plants of the Cool Belts.

Find on the map, page 77, the cool belt of the south. A glance will show that it is scarcely worth notice.

See pictures on pages 39, 81, 93, 94 and 95.

Refer to map on page 77.

113. Plants of the Cold Belt.

The cold belt of the south calls for but slight notice.

See pictures on pages 63, 64 and 81.

For the food of the reindeer, see page 62.

The questions in lesson 114 may supply topics for language lessons.

115. Animals. — Their Teeth, Etc.

The aim of this lesson is to show how animals are fitted to their habitats or native haunts. Study a few of the common animals and discover their peculiarities. Note their habits, and discover the relation of their structure to these habits.

The pictures on page 83 may suggest a line of study.

116. Animals and Their Homes.

The text of this lesson touches upon the structure of animals, their means of defense, and barriers to their dispersal.

Pupils can doubtless give many other illustrations of each of these topics. The pictures on pages 84 and 85 will suggest many interesting stories along the line of the lesson.

117. Animals of the Heat Belts.

In this primary book the animals are not grouped in regions marked out by physical features. The faunal regions are studied in the larger book of the series.

Lesson 117 aims at showing the distribution of a few of the largest and most familiar animals. Notice the coastlines in the picture.

Lesson 118 supplies topics for language lessons.

119. Surface of the United States.

Review thoroughly the surface of the United States. See relief map on page 36.

A large part of Alaska is in the cold belt. This accounts for the word "mainly" in the sentence: "The northern part (of the United States) is *mainly* in the cool belt."

120. People.

This map is based on the census of 1890.

Most of the Indian tribes live in Mexico, Central America and South America.

121. July 4, 1776.

In connection with this lesson it would be well to read several short stories of the Revolution and the causes leading to that struggle.

In lessons 122 and 123 particular attention should be paid to the pronunciation of names. If pupils are to use this word list, they should first receive thorough drill in pronouncing the *key words* at the bottom of the page. Most teachers will doubtless pronounce the geographical names for the pupils.

The spelling of new names should be taught at once by *writing* them.

Lessons 124 to 131.

These lessons treat of the leading industries of the nation. The maps are based on government reports.

The darkest tint on each map shows the region of greatest production. The aim should be to fix in mind the regions whose products affect commerce.

Refer often to the relief map on page 36.

Collect pictures that illustrate these great industries. In this work pictures are of far greater value than any text that can be written.

Ask pupils to bring specimens of products, and use these in giving the lessons.

These lessons need constant reviews, in order to fix in mind the leading facts.

132. Routes of Trade.

Study the pictures. The steamship plies between New York and Liverpool. This freight train is crossing the Rocky Mountain highland. See the snow beside the tracks.

The canal boats are in the Erie canal. The caravan has brought merchandise to a shipping point on the river.

Some teachers may think best to teach a few of the trunk lines of railroad across the United States.

Lessons 133 to 139.

Thorough study should be made of the great commercial centers of the United States. Look for pictures that illustrate these cities.

Search for the causes of each city's growth. This work will call for constant reference to the series of production maps on pages 92 to 99.

Locate each city on the map, pages 90 and 91.

In this primary course it may be well to omit the list of cities named in the second column of page 103, or at least those below Minneapolis.

Lessons 140 to 155.

These lessons aim to present the industrial and commercial life of the leading countries of each grand division. These are the countries that bear the closest relation to the United States.

It is thought that this plan will result in the best preparation for the study of the larger book, and will at the same time be of greatest value to pupils that are obliged to leave school without completing the full course.

Train pupils to read these political maps.

Local Geography.

There are several editions of the Primary Geography, and each presents the special geography of a group of states.

All pupils should study the general text, page 129, relating to the entire group of states, and the text in large type under their own state. The matter in small type need not receive close study. In fact it may be used merely for reference.

Most teachers will doubtless omit the study of neighboring states, or postpone such study till pupils reach the larger book of the series. Such a plan certainly has much to commend it, for the detailed study of all the states in the group would doubtless prove a wearisome and comparatively fruitless task.

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